

# Missouri Resources

Fall 2016 • Volume 33 • Number 4



# director's comment

This summer, I had the honor of joining Gov. Jay Nixon and state parks director Bill Bryan as we dedicated Missouri's 88th state park – Echo Bluff State Park in Shannon County.

As we celebrated the opening of the park on that hot summer day, I recalled a quote by award-winning poet and environmental activist Gary Snyder, "Nature is not a place to visit, it is home."

I couldn't agree more. I felt as if I were home while exploring and enjoying all of the magnificent scenery found within this state park.

I grew up spending time in the natural beauty of the Ozarks with my parents and grandparents. It was on the clear Ozark streams like the Current and Eleven Point where I learned to float, fish, camp and explore our beautiful state. Those are my fondest memories of my childhood – I've always felt as if I were home while spending time with nature.

The Echo Bluff property has a long legacy of providing families with the opportunity to connect with nature and make memories. In 1929, the McMahan and Winkelmeyer families purchased 100 acres and created Camp Zoe.

The summer camp owners were teachers from the St. Louis area and understood the importance of teach-



ing children to spend more time in the great outdoors.

Camp Zoe provided children with the opportunity to learn canoeing, swimming, horseback riding, tennis, marksmanship, archery, fishing and other training in the life of camping until it closed in 1986.

Preserving and protecting this incredible land and history was equally important for the Missouri Department of Natural Resources and Missouri State Parks – as it represents the very essence of our mission.

Since 1917, Missouri State Parks has been inviting children and their families to explore and experience nature in Missouri's beautiful state parks and historic sites.

This 100-year-old tradition of preserving and interpreting the state's most outstanding natural landscapes and cultural features, while providing recreational opportunities to the public is something all Missourians can take pride in. Your state parks and historic sites provide some of the greatest opportunities to get outdoors and truly appreciate all of the beauty our state has to offer. Visit [mostateparks.com](http://mostateparks.com) to learn more.

I certainly hope you will come home to Echo Bluff State Park and start making memories of your own.

Sara Parker Pauley  
Missouri Department of Natural Resources

## Missouri Resources

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### Mission Statement

The mission of the Missouri Department of Natural Resources is to protect our air, land and water; to preserve our unique natural and historic places; and to provide recreational and learning opportunities for everyone.

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## 2 Show Me the Benefits

by *Renee Bungart*

The Missouri Department of Natural Resources' Parks, Soils and Water Sales Tax is up for renewal this November. The benefits of this tax, thrice overwhelmingly reapproved by Missouri voters, are split equally between the Soil and Water Conservation Program and Missouri State Parks.

## 6 A Magical History Tour on U.S. 36

by *Tom Uhlenbrock*

You might expect that a straight shot across the rolling farmlands of northern Missouri would be a real snoozer. As Mark Twain said, "All generalizations are false, including this one." Fact is, there is probably more history on every turn of U.S. 36 than on any other Missouri road. Wait – there aren't any turns.

## 12 The Bricks That Built St. Louis

by *Missouri Geological Survey staff*

It's hard to dispute the perception that everywhere you look in St. Louis, you see brick ... lots and lots of brick. Brick homes, businesses, skyscrapers and apartments. What gave rise to this construction approach? Whatever the reasons, one is certain: a fortuitous little natural resource called *loess*.

departments

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**Above:** Gov. Jay Nixon addresses the crowd at the grand opening of Echo Bluff State Park, in Shannon County.  
**Cover:** Visitors enter and exit the Betty Lea Lodge at Echo Bluff. *MoDNR photos by Ben Nickelson.*

# Show Me the Benefits

by Renee Bungart

photographs by Ben Nickelson



You have to see it to believe it. You've heard that before, right? Seeing something with our very own eyes certainly makes it easier to believe, after all, we do live in the Show-Me State.

## Soil and Water Conservation

Mike Wilbers felt much the same way when he first learned about managed intensive grazing.

After reading everything he could on the subject, Wilbers wanted someone to show him the benefits firsthand. He attended several farm tours and learned a grazing system could benefit his cattle as well as improve the quality of soil and water on his farm.

"I like trying to improve the soil naturally," said Wilbers.



**“I like trying to improve the soil naturally.”**

— Mike Wilbers, Cost-Share program participant

The Wilbers' farm was one of the first in the area to begin managed intensive grazing more than 16 years ago. While the grazing system was working great, they realized they needed to bring the water closer to the cattle and keep them out of the creeks. That's when they learned about the Cost-Share program.

“The local Soil and Water Conservation District office told us they could help share the cost to provide our cattle with water,” said Wilbers.

The Cost-Share program is supported by half of the Parks, Soils and Water Sales Tax. The Department of Natural Resources, through the 114 local Soil and Water Conservation Districts, reimburse landowners for completing voluntary soil and water conservation practices that reduce soil erosion and improve soil health and water quality on their property.

The one-tenth-of-one-percent sales tax was first approved by voters in 1984 and has been reapproved three times showing the voters' support for Missouri's soil and water conservation and park system efforts. It is set to expire if not renewed by voters this November.

The Wilbers didn't apply for the program right away as they were a little unsure – but that's no longer the case. They've seen firsthand the difference the voluntary practices have made on their farm over the years by reducing erosion, improving water quality

in their nearby creeks and increasing the productivity of their soil.

“We are able to provide our cattle with clean, fresh water,” said Wilbers. “And the grazing system allows good cow manure distribution across the farm, which has improved the soil health dramatically. We've not purchased fertilizer for our farm for the last 8 years, which is a huge savings to us.”

Now, the Wilbers are the ones giving farm tours and showing other landowners the benefits gained from the soil and water practices.

Arlene Stewart is no stranger to the Cost-Share program, either. She's participated in five practices since the '90s and has seen the difference it has made on her farm in Osage County. Stewart is currently working on a pest management practice – pests in this case are the weeds in the pasture. By controlling the weeds and allowing the pastures to rest in between grazing, she has seen an increase in the type of grasses coming up in the fields, which included fescue and now timothy and orchard grasses.

“It's expensive to complete the work needed,” said Stewart. “But the funding I've re-

(Opposite page) Cost-share practices help reduce soil erosion and improve water quality, as demonstrated by the clear creek running through the Wilbers' farm. (Above left) Mary and Mike Wilbers have been farming for 37 years and have seen the benefits of implementing cost-share practices on their Bonnotts Mill farm. (Above) The Wilbers manage their grazing by rotating cattle between different-sized paddocks.



The pest management practice improves crop yields or forage production.



Clemens was up for the challenge but wanted to learn everything about camping and cooking before they ventured outdoors overnight. "We thoroughly enjoyed our camping experience. It was helpful to learn the proper way to set up camp, cook and stay safe. It was fun to have family time with no distractions," added Clemens.

Missouri State Parks is able to provide free parks admission and initiatives such as the Learn2 series and interpretive programs with funding from the Parks, Soils and Water Sales Tax. The one-tenth-of-one-percent sales tax provides 75 percent of the budget to operate and improve state parks and historic sites and will expire if not renewed by voters this November.

The Farleys rallied their family of five after being selected to attend the Learn2 Camp weekend at Knob Noster State Park. They love the outdoors and wanted to invest in camping equipment but didn't want to buy unnecessary equipment. They were delighted to get away for the weekend and have an expert show them just what they needed to purchase, and how to use the equipment.

"Being able to experience real camping without having to go out and buy everything you think you need was great," said Jessica Farley. "The facilitators were so great to work with because they were genuinely interested in helping us learn. The experience has opened our eyes to camping and actually

just being outdoors more."

The Farleys are busy with work, school, sports and household chores. They admitted spending time together as a family often becomes a difficult challenge.

"Probably the most rewarding benefit of the trip was simply having our family together without distractions," said Farley. "That alone makes us as parents more interested in putting more effort in to getting away to nature even if just for a weekend or a day."

Missouri's 88 state parks and historic sites provide families with the opportunity to explore nature and spend quality, family time enjoying the outdoors.

To plan a visit to one of Missouri's state parks or historic sites and learn the benefits of spending time outdoors, visit [mostateparks.com](http://mostateparks.com).

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*Renee Bungart is deputy communications director for the Missouri Department of Natural Resources.*

**"We can all agree that outdoor, unplugged play is preferable to being inside and tethered to electronics, but they've wanted to take their outdoor play to the next level – an outdoor vacation."**

– Julie Clemens,  
Learn2 Camp participant

**(Top)** Scott Farley camped as a Boy Scout while growing up. Learn2 Camp provided equipment and training that helped him share the camping experience with his family.

**(Bottom)** Missouri State Parks provided a helping hand to several families who attended three Learn2 Camp weekends during 2016. Participants were provided with equipment and instructors who taught basic camping skills, helping them expand their enjoyment of the great outdoors.



**Arlene Stewart values the work completed on her 294 acres in Osage County, through the Cost-Share program, to improve soil quality and increase source water for her cattle.**

**(Far right) Stewart completed a cost-share practice that excluded cattle from her woods and creeks to protect the vegetation, soil condition and water quality.**

**(Bottom) The Clemens family learned how to pitch a tent, start a fire and cook over a campfire while attending a Learn2 Camp weekend at Knob Noster State Park in Johnson County.**



ceived is helping me improve my property and in the long run, it's definitely making it a nicer, healthier place. It's easy to see the benefits from the program and it's definitely worth the time it takes me to complete that little bit of paperwork."

Landowners like the Wilbers and Stewart have completed more than 220,000 cost-share practices since the sales tax was established in 1984. These good farming prac-

tices have kept more than 177 million tons of soil on our fields and out of our waterways while preserving the productivity of Missouri's working farms. To learn more about the benefits gained from the Cost-Share program, visit the department's website at [dnr.mo.gov/env/swcp](http://dnr.mo.gov/env/swcp).

### **Missouri State Parks**

Have you ever wanted to explore the great outdoors, sleep under the stars or cook over an open fire but not sure where to

begin? Certainly, learning the ins and outs of camping would be a lot easier if the experts were able to loan us the equipment and show us exactly what we needed to know.

That's precisely what the Clemens family found when they attended a Learn2 Camp weekend hosted by Missouri State Parks. Julie Clemens admits she prefers meals from a kitchen, to sleep in a fluffy bed, and air-conditioned vacations. However, her three energetic boys and football coach husband don't agree.

"We can all agree that outdoor, unplugged play is preferable to being inside and tethered to electronics, but they've wanted to take their outdoor play to the next level – an outdoor vacation," said Clemens.



# A Magical History Tour on U.S. 36

by Tom Uhlenbrock



MoDNR photo by Ben Nickelson

**G**et your kicks on Route 36.

Nope, that's not how the song goes.

U.S. 36, which runs arrow-straight for 195 miles across the top third of Missouri, never would be mistaken for its glitzy cousin, Historic Route 66, which headed southwest from St. Louis to Joplin before it was replaced by Interstate 44.

U.S. 36 has no sparkling neon signs, no barn roofs advertising a roadside attraction and no barrage of billboards. The four-lane highway rolls with the gentle hills through a landscape of forest, fields and tidy farms.

Instead of truck stops and fast-food restaurants, the view out the window is of gleaming grain silos and giant rolls of hay stacked neatly in the mowed pastures.

The highway also has a sprinkling of towns that produced enough talented leaders to bill itself as "The Way of American Genius." There also are state parks and historic sites that offer quiet respites from the road.



MoDNR photo by Ben Nickelson

U.S. 36 begins in Ohio, crosses Indiana, Illinois, Missouri and Kansas, and ends at Rocky Mountain National Park in Colorado. For cross-country travelers, it offers a delightful alternative to the hubbub of busy Interstate 70, some 50 miles to the south.

The highway enters Missouri on the east at Hannibal, which draws tourists from all over the world as the boyhood home of the state's most famous author, Samuel Langhorne Clemens, aka Mark Twain.

But if you want to see where it all began, continue west on U.S. 36 and take a detour

(Opposite page) A view of a farm just west of Long Branch State Park, near Macon, is a typical sight while driving along U.S. 36.

(Below) The two-bedroom cabin in which Samuel Langhorne Clemens (Mark Twain) was born is preserved inside the museum at Mark Twain Birthplace State Historic Site in Florida, Mo.



MoDNR photo by Ben Nickelson

**"Heretofore I have always stated that it was a palace, but I shall be more guarded now."**

— Mark Twain

south to tiny Florida, Mo., and the Mark Twain Birthplace State Historic Site. The site displays the cabin where the beloved Clemens was born.

On seeing a photo of the two-room, blue clapboard cabin years later, Clemens wrote, "Heretofore I have always stated that it was a palace, but I shall be more guarded now."

**A**mong the other exhibits at the state historic site is an original handwritten manuscript for "Tom Sawyer." The site is part of Mark Twain State Park, which has trails, campsites and water recreation on an 18,000-acre manmade lake.

At Macon, U.S. 36 runs by another popular recreational area, Long Branch State Park. The park's three boat ramps provide access to sprawling and picturesque Long Branch Lake, which has some of the best bass fishing in northern Missouri.

The park's swimming beach makes it a favorite for families. With more than 80 campsites, Long Branch is a perfect place



MoDNR photo by Tom Ulenbrock

for overnight stays. A restored native prairie shows what much of northern Missouri looked like before the arrival of the plow.

**T**hirty minutes north of Macon at Kirksville is a third state park known for its water recreation. The centerpiece of Thousand Hills State Park is the 700-acre Forest Lake, which offers fishing, swimming and boating. The park has campsites and cabins for overnight stays.

Kirksville also was home to Dr. Andrew Taylor Still, known as “the father of osteopathy.” Still’s impact on medicine is detailed at the A.T. Still Museum of Osteopathic Medicine.

Another one of the American geniuses is honored at Marceline, where the restored Santa Fe Railroad depot is now the Walt Disney Hometown Museum.

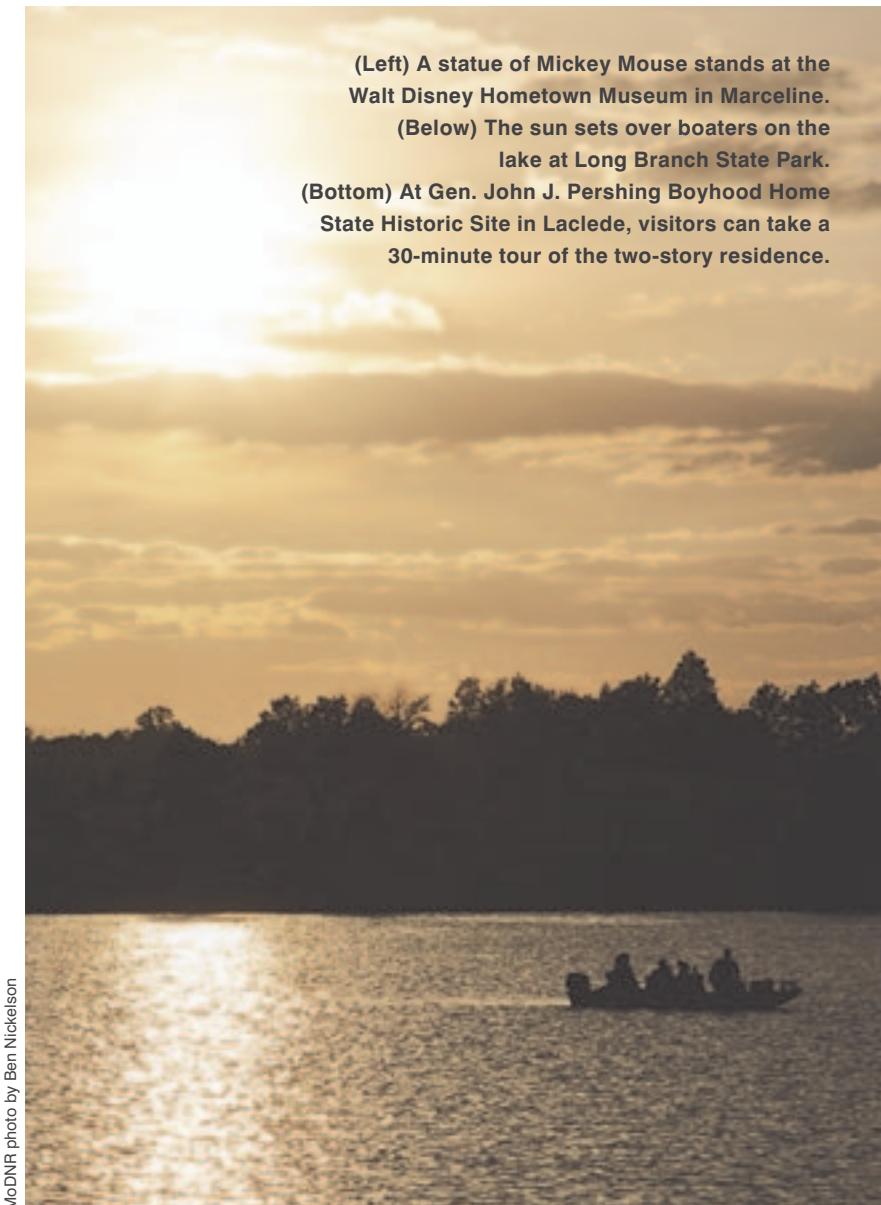
“Last year we had 12,000 visitors from 49 states and six or seven foreign countries,” said Lois Buckman, who was welcoming visitors to the museum.

“We’re proud of our little museum,” said co-greeter Beverly Klumb.

Disney first came to town by train in 1903 at the age of 5, and the museum tells the intimate story of his small-town upbringing. The Main Street USA area at Disney theme parks is modeled after the Marceline that the young Disney knew as a child.

Just a dozen miles farther west near Laclede, a traveler should plan to spend a few hours at a trifecta of attractions – the Gen. John J. Pershing Boyhood Home State Historic Site, Pershing State Park and Locust Creek Covered Bridge State Historic Site.

“Black Jack” Pershing was the com-



MoDNR photo by Ben Nickelson

(Left) A statue of Mickey Mouse stands at the Walt Disney Hometown Museum in Marceline.  
(Below) The sun sets over boaters on the lake at Long Branch State Park.  
(Bottom) At Gen. John J. Pershing Boyhood Home State Historic Site in Laclede, visitors can take a 30-minute tour of the two-story residence.



MoDNR photo by Ben Nickelson



MoDNR photo by Tom Uhlendorf

Travel to the state parks and historic sites along U.S. 36 and claim passport stamps with the Missouri **State Parks Centennial Passport**. For more on the program, visit [mostateparks.com/passport](http://mostateparks.com/passport).



(Left) A bronze statue of Gen. John J. Pershing stands at his boyhood home.

(Below) Locust Creek Covered Bridge State Historic Site is approximately 6 miles west of Laclede in Linn County.



MoDNR photo by Ben Nickelson

(Bottom) Lyle Van Houten's Automotive Museum on Old 36 in Clarence offers a nostalgic presentation of vintage cars and gas pumps.

mander of the American Expeditionary Forces in World War I. His distinguished career is highlighted by his boyhood home, the one-room schoolhouse where he taught, and a bronze statue of one of the country's most renowned military leaders.

**T**he centerpiece of Pershing State Park is a boardwalk that leads for 1.5 miles through the wetlands and swampy forest along meandering Locust Creek, with a wood tower overlooking a rare remnant of a wet prairie.

Locust Creek Covered Bridge is one of four remaining covered bridges in Missouri. Built in 1868, the bridge is the longest of the four at 151 feet and is remarkably well

MoDNR photo by Ben Nickelson





MoDNR photo by Tom Uhlendorf

**(Above)** One of 18 murals painted on buildings around Chillicothe, the birthplace of mechanically sliced bread.  
**(Right)** Boardwalk Trail at Pershing State Park offers guests the opportunity to view a wet prairie, which is home to a wide variety of birds.  
**(Bottom)** The Walter Cronkite Memorial at Missouri Western State University in St. Joseph honors the legendary news anchor.

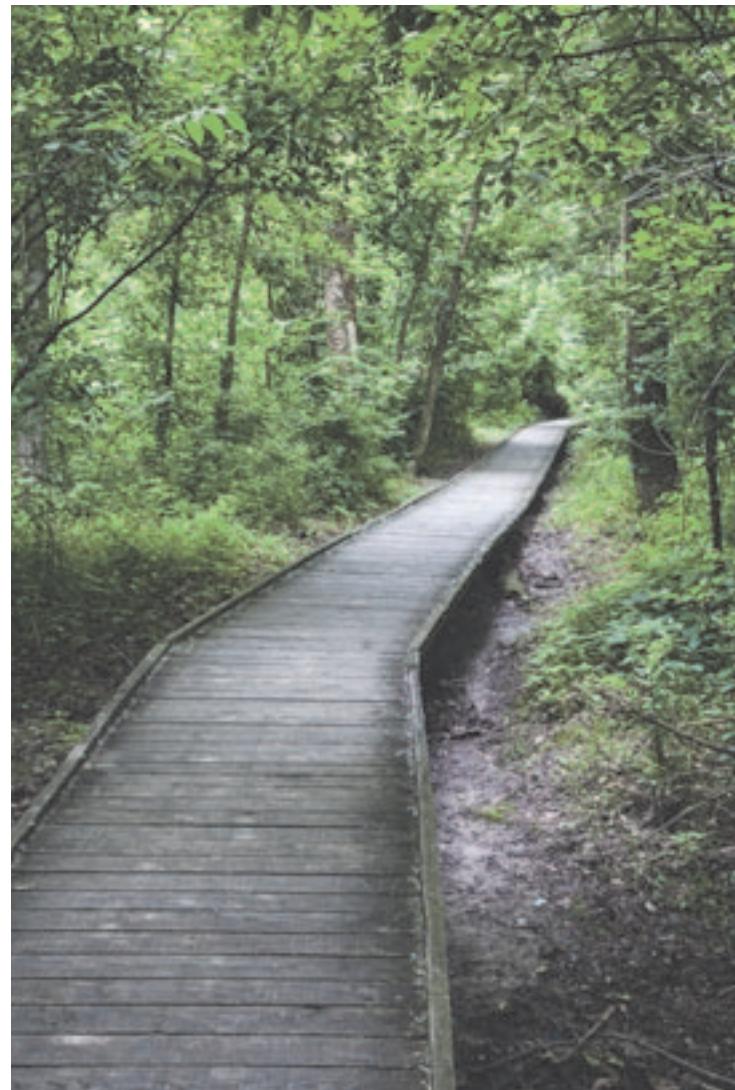
preserved, thanks to a restoration in 2003.

The bridge stands, high and dry, like a wood sculpture in the bottomland forest, with the creek now relocated by nature.

A mural painted on the side of a building in Chillicothe, one of 18 decorating the downtown, proclaims the town as the “Home of Sliced Bread” because a local bakery was the first to sell mechanically sliced bread in 1928.

The famous bread slicer is on display at the Grand River Historical Society Museum in Chillicothe.

Further west, Hamilton was the hometown of J.C. Penney. His legacy of entrepreneurial genius is preserved at the J.C. Penney Library and Museum, which uses



MoDNR photo by Ben Nickelson

artifacts and memorabilia to tell the story of the man who created a retail empire, and taught business to a young Sam Walton. His modest boyhood home is a stone’s throw from the library.

At Cameron, a 6-mile detour south takes you to Wallace State Park, which is a forested oasis amid the agricultural fields of northern Missouri. The park’s wooded hills surround a 6-acre fishing lake and four trails offer hiking.

**B**ecause the park is near the intersection of U.S. 36 and Interstate 35, which slices north and south from Minnesota to Mexico, it draws highway travelers from all over the Midwest.

With 81 secluded campsites and a full-service RV campground with 42 electric sites, Wallace State Park is a popular stop for snowbirds migrating south in the winter, and back north in the spring.

St. Joseph and the Missouri River mark



**“And that's the way it is.”** – Walter Cronkite



MoDNR photo by Ben Nickelson

the end of the trail for the west end of U.S. 36 in Missouri. The town has a wealth of attractions, including the Pony Express National Museum.

The museum tells the story of the relay system in which horseback riders delivered the mail more than 1,900 miles in just 10 days. The stable where the riders first set out in 1860 is part of the museum.

**T**he newest attraction in St. Joseph is a tribute to one of the city's greatest native sons. The Walter Cronkite Memorial is on the campus of Missouri Western State University and honors the legendary CBS News anchor.

The memorial includes 19 exhibits that explore the significant events that Cronkite covered, including World War II, the assassination of President John F. Kennedy, the moon landing and Watergate.

As "the most trusted man in America," the coun-

try turned to Cronkite for its nightly information for more than two decades. Americans rested easy after hearing his signature signoff: "And that's the way it is."

For more information, visit [americanhighway.com](http://americanhighway.com) and [mostateparks.com](http://mostateparks.com). 

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*Tom Uhlenbrock is a writer for Missouri State Parks, a division of the Missouri Department of Natural Resources.*

**(Above)** The scenic overlook at Mark Twain Lake State Park in Monroe County is a great place to view colorful fall foliage.

**(Bottom)** A father leads his young sons to a favorite fishing spot along Lake Allaman at Wallace State Park in Clinton County.



MoDNR photo by Tom Uhlenbrock

# The Bricks That Built St. Louis

by Missouri Geological Survey Staff



Pierre de Laclède Liguest and Rene Auguste Chouteau founded St. Louis in 1764, at the confluence of two of the greatest rivers in North America. At that time, they did not know the city was sitting atop a wealth of very special “dirt” called loess (pronounced *lühs*). The loess deposits that blanketed the bluffs of the Missouri and Mississippi rivers were later used to make a distinctive red brick that is still seen on numerous buildings that can be found across the St. Louis area.

“Beautiful brick buildings are amazingly unique and abundant in the city of St. Louis. Almost all of the

older buildings made of brick were constructed from a local natural resource that was derived from and manufactured within the city limits,” said Mimi Garstang, retired Missouri State Geologist with the Department of Natural Resources.

Two noteworthy buildings that were constructed using local brick include the Eugene Field House and the Wainwright Building. Now known as the Eugene Field House & St. Louis Toy Museum, it was built in 1829 and is located at 634 South Broadway.

The immaculate three-story home is typical of the townhouse-style dwellings popular in many urban resi-

dential neighborhoods of the area during the early 19th century.

Roswell Field, the attorney who worked free of charge on Dred Scott’s federal court case to free him and his family from slavery, once owned this home. Field’s son Eugene, the “Children’s Poet,” wrote *Little Boy Blue* and other works.

Field also was literary editor of *The Missourian*, the University of Missouri’s campus newspaper.

The majestic Wainwright Building was built for St. Louis brewer Ellis Wainwright in 1891. Located at 709 Chestnut St., the 10-story landmark is among the world’s first skyscrapers.

(Opposite page) The Wainwright Building, 709 Chestnut St., was designed by Dankmar Adler and Louis Sullivan, known as the "Father of Skyscrapers," and built in 1891. MoDNR photo by Ben Nickelson

(Below left) Eugene Field House & St. Louis Toy Museum was built in 1829 at 634 South Broadway and was the boyhood home of writer Eugene Field.

(Below right) Painted brick houses grace the 5100 block of Wilson Ave. on The Hill in south St. Louis.

(Bottom) Soulard Market Apartments on Eighth Street is a redeveloped brownfields site originally built in 1875 as a factory for the Welsh Baby Carriage Co.



MoDNR photo by Ben Nickelson



MoDNR photo by Ben Nickelson

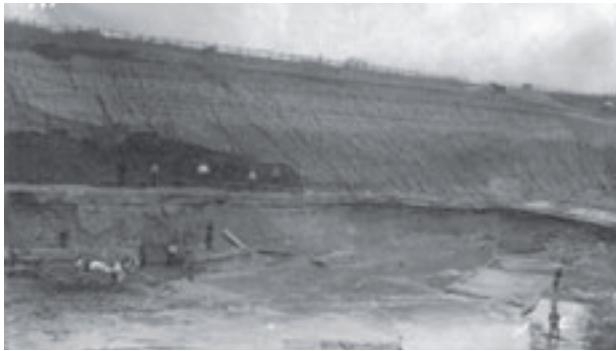


MoDNR photo by Ben Nickelson

MoDNR photo by Ben Nickelson



MoDNR file photo



MoDNR file photo



## Loess 101

Loess is found in many areas around the world. Deposits of loess in the St. Louis area are believed to have formed during the ice age in what geologists call the *Pleistocene epoch*, beginning about 1.6 million years ago. The slow but relentless grinding action of advancing glaciers on bedrock created large amounts of rock debris ranging in size from huge boulders to silt.

During the subsequent glacier retreats, meltwaters carried large amounts of rock debris into the Missouri and Mississippi river valleys. During times of dry weather, winds swept a considerable amount of dusty rock debris out of the river valleys and deposited it along both sides of the river bluffs.

This naturally occurring, fairly cohesive surficial material is composed primarily of very small, wind-blown particles of quartz and clay minerals. Lesser amounts of calcite and iron oxide mineral matter comprise the bulk of the remainder. Loess typically has a characteristic yellow to brown color.

(Top) St. Ambrose Catholic Church was built in 1926 of Romanesque-style bricks and terra-cotta, and influenced by the Sant'Ambrogio Church in Milan, Italy. In front of the building, on the corner of Wilson and Marconi avenues, is a sculpture by Rudolph Torrini. (Above middle) Blackmer & Post operated a huge clay and loess mining operation on Eyler Ave, circa 1895-1905. (Above) Workers operate a hydraulic brick press at St. Louis's Hydraulic Press Brick Co. during the same time period.

# Documentary Highlights St. Louis's "Brick Story"

In 2011, filmmaker Bill Streeter released his documentary, *Brick By Chance and Fortune: A St. Louis Story*. The award-winning documentary chronicles St. Louis's rich history as both a producer and user of brick – a building material that is as lovely as it is sturdy.

Streeter recognized a large part of the "brick story" involved the naturally occurring source of the brick product. His documentary includes an interview with Mimi

Garstang, retired State Geologist with the Department of Natural Resources.

"I was thrilled that Mr. Streeter wanted to better understand the natural resources that were necessary to make the brick manufacturing and beautiful building stock possible," said Garstang.

Watch the documentary online at [bit.ly/1NjiN5t](http://bit.ly/1NjiN5t) and note that when "clay" and "clay pits" are mentioned, this generally is a reference to the loess that was used to make the distinctive red brick in St. Louis.



## Making Bricks from Loess in St. Louis

Because of its abundance and ease with which it could be obtained, loess was the most important brick-making material in St. Louis. The characteristic red color of St. Louis bricks results from a trace amount of iron oxide minerals naturally present in the area's loess deposits. Often, nothing had to be added to the loess prior to firing it in the kiln. The brick that was produced so easily created a durable product that needs almost no maintenance. Sufficient amounts of the resource allowed the brick-making industry to flourish in St. Louis for more than 100 years.

"Around 1900, the city had more than 100 brick manufacturing plants. St. Louis soon became known for the quality, craftsmanship and abundant brick supply," Garstang said.

Thomas H. Scales started the first brickyard in St. Louis in 1859. The Hydraulic Press Brick Co. was established in 1868, and by the late 1800s became the largest brick maker in the world. Hydraulic Press developed the very popular "dry-press method" for making common building brick. This method involved plowing and scraping the loess deposit. The loosened loess was shoveled by hand into carts



MODNR photo by Ben Nickelson

and wheelbarrows and hauled to drying sheds. The dry loess was pulverized and screened to the correct particle size and then formed into the shape of bricks using a 40-ton press. The raw bricks were then fired in large kilns and allowed to cool slowly for two to three weeks.

The "soft mud method" involved shoveling loess into large basins 2 to 3 feet deep, wetting it with water, and allowing it to soak for 24 hours. The resulting mud was transported to a brickmaker who worked it and placed it into a wooden mold that could form one to six bricks at a time. A brickmaker typically formed 3,000 bricks per workday. The brick was allowed to dry in the molds, often requiring frequent turning to prevent cracking. Firing was done in kilns.

**Enamelled brick can be glazed in almost any color.**



MoDNR photo by Ben Nickelson



MoDNR photo by Ben Nickelson



MoDNR photo by Ben Nickelson

(Top) Brick construction is still in vogue as this new commercial office space attests on Edwards Street on The Hill. (Above left) This refractory brick from the National Building Arts Center in Sauget, Ill., was made by Evans & Howard Fire Brick Co. in St. Louis. It was recovered from the former Carondelet Coke Co. ovens in St. Louis. (Above right) To attempt to match the brick on the top eight stories, brown sandstone, pictured here, was used to create the decorative trim on the Wainwright Building's bottom two floors. Sandstone and red Missouri granite were used for the bottom two story's heavy exterior base. (see photo on page 12).

Bricks also were manufactured using the “enameled brick method,” in which a colored glaze was applied to one or more of the brick faces. This made it possible for the faces of bricks to exhibit any color of the rainbow including black, white and gray.

## Brick by the Numbers

Brick production in St. Louis soared after the Civil War when many successful companies emerged and flourished in the area.

In 1889, more than 200 million bricks were produced in St. Louis. At least 33 companies with 38 brickyards and 172 kilns were operational in 1890. Hydraulic Press Brick Company alone produced more than one-

third of the total bricks manufactured. Union Press Brick Company and College Hill Press Brick Works also were major contributors.

In 1890, St. Louis brickyards produced nearly 250 million bricks, then valued at more than \$2.25 million – about \$1 billion in today’s dollars. The heyday of the industry in St. Louis was at the turn of the 20th century when more than 100 companies made brick.

With the gradual depletion of loess deposits in St. Louis city, the brickyards that remained became increasingly dependent on loess that had to be shipped in from St. Louis County. Eventually, the center of brick making shifted to St. Louis County. In 1952,

the last loess brick was made in St. Louis city proper, but continued in St. Louis County into the 1980s.

## Minerals and the Missouri Geological Survey

“Since 1853, the Missouri Geological Survey has been instrumental in locating, describing and evaluating the state’s mineral deposits,” said Carey Bridges, the department’s Geological Survey Program director. “We monitor minerals industry activity, tabulate annual production statistics and provide technical assistance to those engaged in or wanting to become involved in the business of developing Missouri’s wealth of mineral resources,” she added.



MoDNR photo by Ben Nickelson



MoDNR photo by Ben Nickelson



MoDNR photo by Ben Nickelson

The department also helps ensure that minerals are developed in a responsible and environmentally safe manner. It requires that mined land is reclaimed for useful purposes after the mining process has been completed.

Missouri's mineral resources – including loess and the bricks made from it – are essential for building and maintaining our modern way of life. They continue to contribute significantly to the economic well-being of

the state by providing business opportunities and well-paying jobs. In recent years, the development of Missouri's mineral resources has contributed between \$4-8 billion per year to the state's economy. Learn more online at [dnr.mo.gov/geology/geosrv/geores/#minerals](http://dnr.mo.gov/geology/geosrv/geores/#minerals). 

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*The Missouri Geological Survey is a division of the Missouri Department of Natural Resources.*

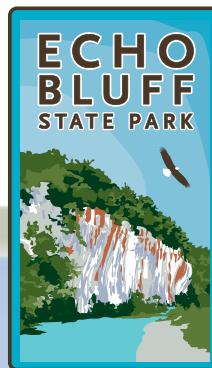
**(Top left)** Ornamental dry-pressed brick made by Hydraulic Press Brick Co. and Anthony Ittner Brick Co., both of St. Louis, courtesy the National Building Arts Center.

**(Top right)** Larry Giles, director of the National Building Arts Center, stands in front of pallets of street paving blocks. The blocks came to St. Louis as train ballast from Wabash Clay Co. in Veedersburg, Ind.

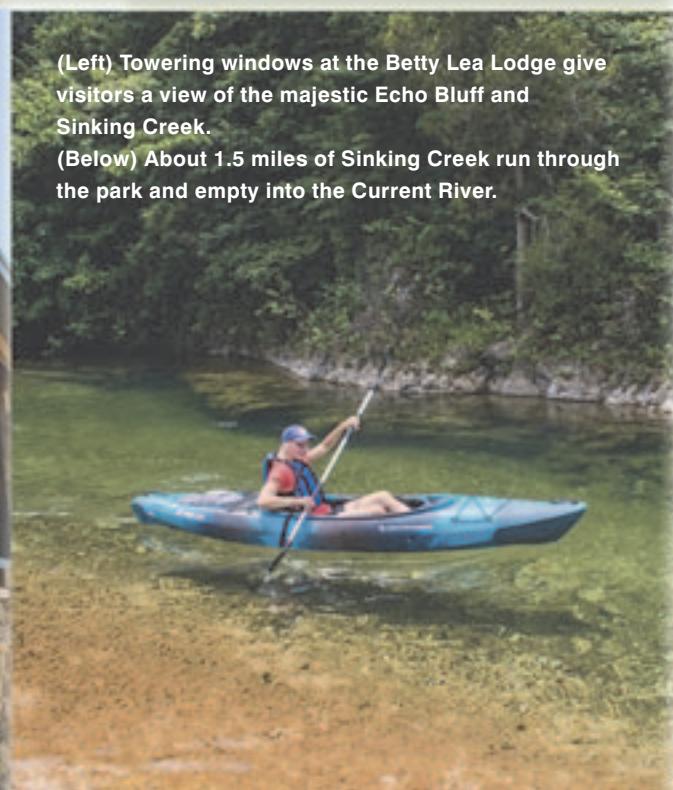
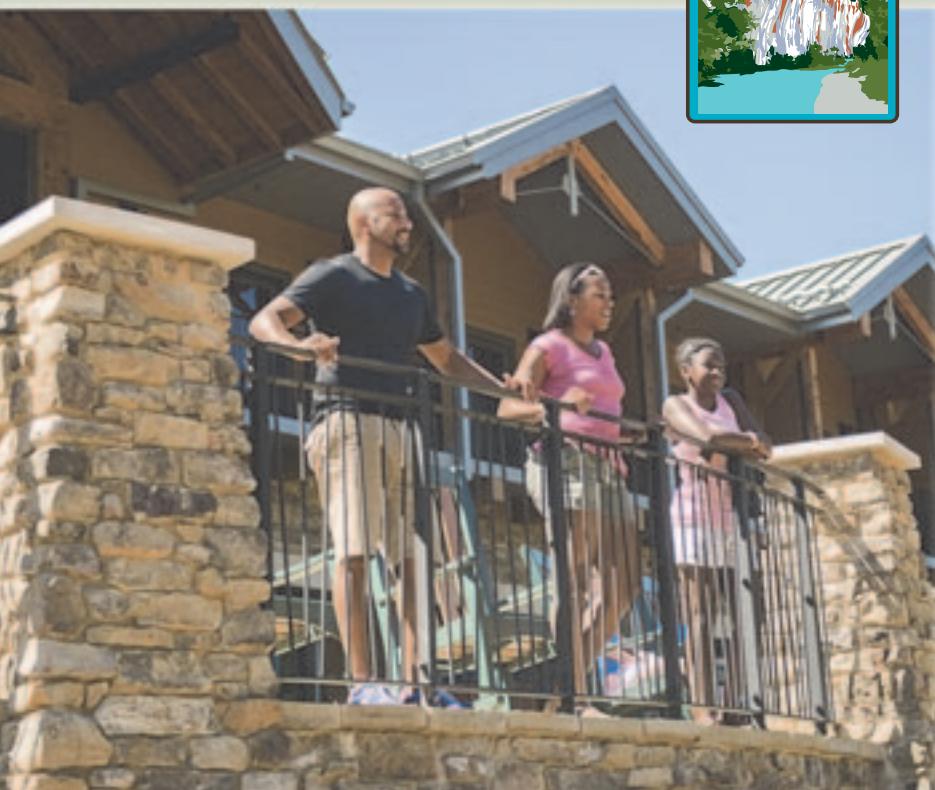
## New State Park

by Tom Uhlenbrock

photographs by Ben Nickelson



## Opens in the Heart



**G**ov. Jay Nixon has an invitation – and a promise – for Missourians.

Nixon wants everyone to visit the new Echo Bluff State Park, which opened July 30 and is billed as the Gateway to the Ozarks. The park is off Highway 19, about halfway between Salem and Eminence.

The Governor predicts that those who make the trip will enjoy the picture-perfect Ozarks setting that has drawn visitors for decades and is now open to the public.

"If they don't already know it, Missourians are going to discover we've got an immense treasure in Echo Bluff that will be preserved for generations to come," Nixon said.

The park is named for the concave bluff that stands over the clear waters of Sinking Creek, which empties into

the Current River.

With an iconic 20-room lodge, 13 lodging units in nine cabins with kitchens, 12 "walk-in" campsites and 60 RV spaces, the park serves as a family-friendly base camp that allows visitors to explore the rivers, springs, waterfalls, grist mills and wooded trails in the heart of the Ozarks.

Guests entering the lodge are greeted in the atrium by a massive stone fireplace that soars to the ceiling. The two-story lodge includes a restaurant and an outdoor deck that looks out over the sparkling creek and buff-colored bluff.

All the rooms in the lodge have gas fireplaces and outdoor decks. They have king beds with a sleeper sofa, and there are two-bedroom suites.

Five detached cabins are next to

the lodge. Four have two bedrooms and one has four. All have wood-burning fireplaces with gas starters, spacious decks and full kitchens. Four "stacked" duplexes stand on the hillside opposite the lodge.

The bottom floors have three bedrooms, including one with bunk beds, and the top floors have three bedrooms with a loft. Large families and groups can rent both floors of the distinctive duplexes.

Accommodations are available year-round. There is a two-night minimum on weekends in the lodge, and all year for the cabins. Free WiFi is available throughout the park. Prices vary by season and day of the week.

The park's campground features 60 RV sites with 50-amp electric and water, and most include sewer hook-

# of the Ozarks



(Left) Sinking Creek is the perfect place to spend a lazy, hot summer afternoon with swimming, wading or fishing for small-mouth bass.

(Above and right) Timbuktu Campground at Echo Bluff State Park offers basic “walk-in” campsites for tent camping, premium electric/water and full-service sewer/electric/water campsites for recreational vehicles.



ups. There also are 12 “walk-in” campsites where visitors hike a short distance on trails leading into the Ozark woods to camping decks and fire rings.

The lodge has the Creekside Grill, with indoor and outdoor seating, and the Sinkin' Creek Mercantile, a gift shop and general store that uses the local spelling for the creek.

Breakfast, lunch and dinner will feature a variety of options ranging from omelets, hamburgers, bison meatloaf and Kansas City ribs. The gift shop and store has snacks, souvenirs and necessities such as sunscreen and fishing gear.

Adjacent to the lodge is a small lake that will be stocked with crappie, bluegill, bass and catfish where young anglers can test their skills.

**A**n amphitheater for nature programs and entertainment is next to the lake, and further down the trail is the Adventure Playground. It includes attractions designed to make young, aspiring adventurers comfortable in the Ozark outdoors.

Sinking Creek is shallow and warmer than most Ozark streams. While the creek is calm and gentle most of the year, it also can present a challenging float trip when water is running fast, especially in the spring.

The park is right in the middle of Missouri's famed floating country, within a short drive of the best sections of the upper Current and Jacks Fork rivers.

Information on local float outfitters is available at the Betty Lea Lodge front desk. Echo Bluff State Park

plans to offer floating in 2017.

Visitors can spend a week-long vacation exploring the beauty and solitude of this Ozarks gem, or they can venture out to the other scenic wonders located within an hour's drive of the park.

“If you want to see a historic mill and turquoise spring, you can do it from Echo Bluff,” said Bill Bryan, director of state parks. “If you want to go trout fishing, it's a short drive to Montauk State Park. If you want to see elk, it's a short drive to Peck Ranch. Echo Bluff offers that full Ozark experience.”

For more information, visit [mostateparks.com](http://mostateparks.com).

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*Tom Uhlenbrock is a writer for Missouri State Parks.*



## MoDNR Youth Education and Interpretation Program

The Department of Natural Resources' Youth Education and Interpretation program provides education and interpretive resources for youth, teachers and youth leaders.

The department is responsible for protecting our natural resources and has the opportunity to make a unique contribution through education, interpretation, partnerships and the knowledge and expertise of its staff.

The program has launched a new website covering subjects that span natural and cultural resources, stewardship, the connection between nature and health, and education about the department's role in these areas. In addition to youth-oriented informational pages, the website provides les-

son plans for the classroom and activities for everyone. Explore the Youth Education and Interpretation website at [dnr.mo.gov/education](http://dnr.mo.gov/education).

### "Unseen Benton" Painting Unveiled

In July, Missouri State Parks unveiled a never-before-exhibited original oil painting by Thomas Hart Benton at the Thomas Hart Benton Home and Studio State Historic Site in Kansas City.

The "Unseen Benton" is the debut of a very early Benton still-life painting. The untitled work is an example of young Benton's attempt to paint in the style of the French artist and Post-Impressionist, Paul Cézanne, and has never been exhibited in any art museum, art gallery or catalog.

The painting was owned by Benton's New York City dentist, Dr. Moritz

Jagendorf. Later it was inherited by his granddaughter, Ruth Alpert of Santa Barbara, Calif.

Thomas Hart Benton Home and Studio State Historic Site is open 10 a.m. to 4 p.m. on Monday, and Thursday through Saturday. The site also is open Sunday from noon to 5 p.m., April through October, and 11 a.m. to 4 p.m. November through March. For more information on the studio, visit [mostateparks.com](http://mostateparks.com).



### Pesticide Collection Program Results

The Missouri Pesticide Collection Program, coordinated by the department's Hazardous Waste Program, had another successful year, collecting a total of 64,607 pounds of waste pesticide from 160 Missouri farmers and households.

## Time Exposures

Photo courtesy Carole Niemeier Tipton



Just to the left of the shoe store, but out of view, was a haberdashery – or men's clothing store – as it was referred to at the turn of the 20th century. The prices shown for all shoes in the photo were less than \$5.

Much of the surrounding area will soon become the National Geospatial-Intelligence Agency, west location.

This photo of John Frederick Niemeier, his wife Elise Fredensburg Niemeier and their son Alvin C. Niemeier was taken in 1904 in front of their shoe store at 2912 N. Market St. in St. Louis. Elise and John were the children of Danish and German immigrants, respectively, and for a time lived the American dream, operating their store in a bustling city that would soon host the World's Fair and Olympic Games. Alvin, the first of five children, is wearing shoes made by his father. Carole Niemeier Tipton of St. Charles, Alvin's daughter, submitted the photo from her collection.

Send your photo to "Time Exposures," c/o Missouri Resources, PO Box 176, Jefferson City, MO 65102-0176. Original photos will be returned via insured mail. Pre-1980 environmental and natural resource photos from Missouri will be considered. Please try to include the date and location of the picture, a brief description and any related historic details that may be of interest to our readers.

Since the program's inception in 2012, 252,857 pounds of waste pesticide from 924 participants has been collected and properly disposed. The calendar year 2016 collections were in Bolivar, Canton, Fairfax, Montgomery City, Poplar Bluff and Portageville. Collection event locations for 2017 are being determined.

For more information and updates on the Missouri Pesticide Collection Program, visit [dnr.mo.gov/env/hwp/pesticide](http://dnr.mo.gov/env/hwp/pesticide).



### **Earth Science Week 2016**

Join MoDNR in celebrating Earth Science Week in order to gain a better understanding and appreciation for the Earth Sciences. Events are scheduled for Oct. 9-15 and will celebrate the theme, "Our Shared Geoheritage."

Geoheritage is the collection of natural wonders, landforms and resources that are available to this generation to effectively manage, use and conserve. Geoheritage locations are valued for many reasons, including scientific, economic, ecological, educational, cultural, aesthetic, artistic and recreational purposes.

Learn about Geoheritage through a self-guided tour of the Ed Clark Museum of Missouri Geology, 111 Fairgrounds Road, Rolla. The museum is open weekdays from 8 a.m. to 5 p.m. The facility will be closed Oct. 9 in observance of Columbus Day. For a list of Earth Science Week events and contests, visit [dnr.mo.gov/geology/education.htm](http://dnr.mo.gov/geology/education.htm).

### **Carver Prairie Restoration**

The Department of Natural Resources is excited to partner with the Missouri Prairie Foundation (MPF) to help restore prairie lost due to mining and contamination. The department and the U.S. Fish and Wildlife Service (USFW) are trustees for the state's Natural Resource Damages Program, and have committed \$750,000 to date

## **OUR MISSOURI WATERS**

### **Is Meramec River Flooding Our "New Normal?"**

The Meramec River is the longest free-flowing river in Missouri and has been a source of flood damage for many years. Despite the known hazards of flooding, emergency management teams suffer from a lack of information both during and after floods. Municipalities, industries and residents have to make quick and expensive decisions regarding evacuation and removal of equipment and property.



MoDNR file photo

**1993 floodwaters at the confluence of the Meramec and Mississippi rivers.**

Last March, the Department of Natural Resources facilitated a meeting with local leaders from the Lower Meramec Watershed to discuss recent flooding and future planning. The U.S. Geological Survey's Missouri Water Science Center proposed developing online flood inundation mapping tools for a selected reach of the lower Meramec River. The USGS helps communities protect lives and property by providing tools and information to help them understand local flood risks and make cost-effective decisions. The first phase of this project, between Valley Park and Fenton, is partially funded by USGS, the U.S. Army Corps of Engineers, the Missouri Department of Transportation and the Metropolitan St. Louis Sewer District. For more information, contact Amy Beussink, USGS, at 573-308-3665 or [ambeussi@usgs.gov](mailto:ambeussi@usgs.gov).



for MPF to acquire and restore remnant prairie. Carver Prairie is one example of this partnership in which MPF was able to purchase a 160-acre tract of land in Newton County for prairie restoration.

In the department's capacity as trustee, it has the responsibility to restore, replace, or protect the equivalent of the resources that have been lost and provide the greatest benefit to Missouri's citizens and to the health of our environment. The Carver Prairie tract includes 65 acres of original unplowed prairie that will be protected and an additional 26 acres that will undergo prairie reconstruction. The purchase also includes 69 acres of sa-

vanna woodlands.

These projects support the department's larger mission, as preserving prairies helps protect water quality, provides habitat for pollinators and species like Monarch butterflies, and expands opportunities for the public to enjoy nature.

*For news releases on the Web, visit [dnr.mo.gov/news](http://dnr.mo.gov/news).*

*For a complete listing of the department's upcoming meetings, hearings and events, visit the department's online calendar at [dnr.mo.gov/calendar/search.do](http://dnr.mo.gov/calendar/search.do).*

*Looking for a job in natural resources? Go to [dnr.mo.gov/hr](http://dnr.mo.gov/hr).*

# top spots

## Top Spots for Learning about Missouri State History



MoDNR photo by Ben Nickelson



MoDNR photo by Ben Nickelson

First granted statehood on Aug. 10, 1821, Missouri's early history covers several buildings and two cities. Visitors can get a glimpse of this interesting history at First Missouri State Capitol State Historic Site and the Missouri State Museum.

"The City of Jefferson," was chosen as Missouri's permanent capital. Until the new Capitol could be constructed, legislators needed a place to meet. On Nov. 25, 1820, St. Charles was officially made the first capital of Missouri, and the state's first legislators met there on June 4, 1821.

Today, First Missouri State Capitol State Historic Site in St. Charles includes eleven rooms in the Capitol complex that have been restored to their original state. Visitors can take a guided tour through the actual rooms where Missouri state government was created.

The Missouri State Museum in Jefferson City is located on the first floor of the current Capitol. The museum includes exhibits and displays that highlight the state's natural and cultural history.

The present Capitol is actually the third to stand in Jefferson City. The first was built in 1826, but flames engulfed that building in 1837. The second and much larger Capitol was designed in classical Revival structure, but also burned on Feb. 5, 1911. A few months later, in a special election held Aug. 1, 1911, Missourians approved the issuance of \$3.5 million in state bonds for a new Capitol, which was officially dedicated on Oct. 6, 1924.

All four floors of Missouri's Capitol are open to the public. Free guided tours are offered year-round by the Missouri State Museum. Guests should meet at the tour desk on the first floor.

By touring First Missouri State Capitol State Historic Site and visiting the Missouri State Museum, guests can get a rewarding glimpse of the legacy of our state. For more information, including specific tour times and hours of operation, visit [mostateparks.com](http://mostateparks.com).



MoDNR photo

(Top left) Children learn about natural history while exploring the Missouri State Museum.  
(Top right) An interpreter presents artifacts at the general store at First Missouri State Capitol State Historic Site during a Statehood Day celebration in St. Charles.  
(Left) The Missouri State Museum is located on the first floor of the State Capitol building in Jefferson City.



Missouri State Parks – a division of the  
Missouri Department of Natural Resources



## 1000th Mile Trail, Harry S Truman State Park

(Above, left) Director of Missouri State Parks, Bill Bryan, and a park guest take in a view of Truman Lake along 1000th Mile Trail.

**O**fficially opened in fall 2015, the 1000th Mile Trail at Harry S Truman State Park marks the park system's 1,000th mile of trail. The trail also interprets the ongoing efforts to remove invasive red cedars and restore a glade area.

The trail begins with a 30-yard level concrete path to a bench overlooking the glade restoration area. From the bench, the trail drops to the bottom of the glade before continuing along a ridge to an old service road where it opens up to a scenic

area of the lake. Once back in the wooded area, the trail follows the land's contour back to the trailhead.

Hikers will commonly see birds such as eagles and turkey vultures, wildflowers such as western wallflower, and glade plants like prickly pear cactus. This trail also offers spectacular views of Truman Lake from the bluff.

Harry S Truman State Park is 6 miles west of Warsaw on Highway 7 in western Benton County.

(Top right and right) Brian Bethel, Superintendent at Harry S Truman State Park, leads a school group on the inaugural hike after the trail's ribbon cutting in October 2015.



MoDNR photos by Ben Nickelson

# Rock Matters

**P**yrite is typically a secondary mineral in small quantities of other rocks and ore deposits. The diagnostic physical properties of pyrite are brassy metallic luster, black streak, brittle fracture, hardness greater than that of glass, absence of cleavage and it is nonmagnetic. The crystalline structure of pyrite can produce crystal in the shape of cubes, octahedrons or pyritohedrons, and commonly have striations on the crystal faces.

It may be found in many areas of the state. Pyrite is the most widespread and abundant of the sulfide minerals and it occurs in all types of rock. Often found in coal, limestone and dolomite, pyrite is a common mineral that occurs in quartz veins with many other economically important metallic sulfide minerals such as galena, sphalerite, chalcopyrite and elements like gold and silver.

When at or near the surface, pyrite weathers relatively rapidly as it reacts chemically with water and atmospheric oxygen. This weathering can produce a type of rust that often stains rock outcrops with a reddish hue.

The swamps of Missouri's past that covered much of western and central Missouri during what geologists call the *Pennsylvanian Period* of geologic time (365-290 mil-



## pyrite

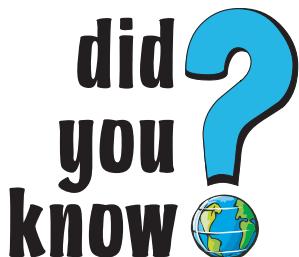
Pyrite (iron disulfide,  $\text{FeS}_2$ ), also called "Iron Pyrite" or "Fool's Gold," because it is often mistaken for gold, is a brass-yellow or pale-bronze mineral composed of iron and sulfur.

MoDNR photos by Mark Gordon

lion years ago) produced one form of pyrite. As the plants and animals of these swamps died, they fell to the bottom of the swamp. The layers of carbon accumulated until sea levels eventually rose and covered them with sediment. Burial under those sediments produced both pressure and heat that forced the organic matter of the swamp to undergo physical and chemical changes and become coal. Under the oxygen-poor conditions of the swamp, sulfur combined with iron to form pyrite – an impurity in the coal.

When pyrite-rich rocks are brought to the surface by mining, they react to the oxygen in the air. This oxidation in combination with iron-loving bacteria converts the pyritic sulfur into sulfuric acid. The reddish or yellow color of mine runoff is iron and other minerals dissolved in the acidic water.

Pyrite can be used as a source of sulfur in the manufacture of sulfuric acids for both industry and agriculture. It can be burned to produce sulfur dioxide for use as a food preservative, but it is considered a toxic gas when emitted from the smoke stacks of a coal-fired power plant. Pyrite has been used in jewelry making for several centuries and it remains popular today. However, it is often misnamed and sold as marcasite.



## Unintended Trail Systems Start With Foot Traffic

Traveling off-trail can be necessary to enjoy activities such as fishing and camping, or to see natural wonders that aren't viewable from a trail. Doing so also can have unintended effects. Desire paths or "social trails" are paths created by human (or animal) foot traffic.

Desire paths usually represent the shortest or easiest route between two points. You've probably seen them in public parks, college campuses and even in your own yard. As few as 15 passages over a site can cause them to form, and once they do, they tend to attract increased use. For protected habitats, pristine areas and areas around sensitive cultural and archeological resources, these paths can be destructive.

Existing trails or previously disturbed routes, some of which are desire paths, are preferable over walking into an undisturbed area. Roads and formal trails can never provide access to everything visitors wish to see, so if you absolutely must go off-trail, distribute your travel lines so as to not inadvertently create new trails. If an area is marked as off limits, respect the notices and stay on the designated trail.

Leaving no trace when enjoying natural areas should be something we all practice. For information on other ways to reduce your impact, start with the Leave No Trace Center for Outdoor Ethics 7 Principles which can be found at [lnt.org/learn/7-principles](http://lnt.org/learn/7-principles).





## MISSOURI'S WATER PLAN

by Todd Sampsell

The Missouri River, west of Jefferson City.

MoDNR photo by Andrew Richmond

**A**ccording to recent surveys, state water managers across the U.S. predict that as many as 40 out of our 50 states will experience some level of water shortages over the course of the next decade.

Missouri's southwest and northern tier of the state have already experienced water concerns; most recently in the drought of 2012. How would Missouri fare during an extended, multi-year drought? As weather patterns continue to change and fluctuations between severe drought and torrential rain seem to come with more frequency, how do we ensure Missouri's communities, industries and natural systems are prepared for challenges to both water quantity and quality?

The answer lies in a monumental undertaking being led by the Department of Natural Resources to update Missouri's water plan. Missouri's Water Resource Law charges the department with the responsibility to develop, maintain and periodically update Missouri's water plan. The most recent plan was completed in 2003.

We've made tremendous progress for Missouri's water resources since the first state water plan was completed in 1937. However, for many parts of Missouri and across the country, water needs are rapidly changing. New industries bring new water needs and increased agricultural demand to feed a growing world population means increased irrigation. With so many western states experiencing water shortages and eyeing sources like the Missouri River, the time is

now for Missouri to update its state water plan.

The department recently initiated the update process by quantifying Missouri's current water demands for all uses, including agricultural, community drinking water, energy and other industries, and healthy aquatic systems that support our fisheries, outdoor recreation and tourism.

Current water uses and priorities will be documented through an intense, publicly driven, stakeholder engagement process representing numerous entities. We expect the process to take two to three years to ensure we have learned about all of Missouri's increasing water demands that will help define water priorities by region across the state. The plan will also take into consideration expected, projected and potential growth for population and water needs by water-use sector for all regions of the state over the next half century.

By looking at current demands, projecting future demands and comparing water availability now to projected changes, we can continue to plan for potential gaps. Stay connected to this effort by visiting our website at [dnr.mo.gov/mowaterplan](http://dnr.mo.gov/mowaterplan). Missouri traditionally has been blessed with rich and diverse water resources and Missouri's water plan will set a clear vision for water resources management in Missouri through the year 2060.

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*Todd Sampsell is deputy director of the Missouri Department of Natural Resources.*

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OF NATURAL RESOURCES  
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## Echo Bluff is Ready ... for YOU!

Looking for an adventure in the Ozarks? Make your reservation today at Missouri's newest state park. Set up your basecamp at Echo Bluff State Park and explore all the hiking, fishing and wildlife the area has to offer. Visit [echobluffstatepark.com](http://echobluffstatepark.com) to book your room or campsite.



*Missouri State Parks – a division of the  
Missouri Department of Natural Resources*

